



# Economics for a Full World

## GTI Roundtable

### June 2015



Pioneering ecological economist Herman Daly explains why the core premises of neoclassical economics are invalid and why we urgently need a steady-state economy that promotes qualitative development, not quantitative growth. Our panelists discuss how to get economics and economic policies to align with human needs and ecological limits.

# GREAT TRANSITION INITIATIVE

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## Contributions

### Opening Essay

|                                                  |   |
|--------------------------------------------------|---|
| <b>Economics for a Full World</b> by Herman Daly | 1 |
|--------------------------------------------------|---|

### Roundtable

|                       |    |
|-----------------------|----|
| <b>John Barry</b>     | 18 |
| <b>Nancy Folbre</b>   | 25 |
| <b>Tim Jackson</b>    | 27 |
| <b>Giorgos Kallis</b> | 32 |
| <b>Robert Paehlke</b> | 36 |
| <b>Stephen Purdey</b> | 39 |
| <b>Alan Willis</b>    | 42 |
| <b>Eric Zencey</b>    | 44 |

### Author's Response

|                                            |    |
|--------------------------------------------|----|
| <b>Response to Comments</b> by Herman Daly | 53 |
|--------------------------------------------|----|



# Economics for a Full World

Herman Daly

*This essay has been adapted from a speech delivered on the occasion of the Blue Planet Prize, Tokyo, November 2014.*

**Abstract:** Because of the exponential economic growth since World War II, we now live in a full world, but we still behave as if it were empty, with ample space and resources for the indefinite future. The founding assumptions of neoclassical economics, developed in the empty world, no longer hold, as the aggregate burden of the human species is reaching—or, in some cases, exceeding—the limits of nature at the local, regional, and planetary levels. The prevailing obsession with economic growth puts us on the path to ecological collapse, sacrificing the very sustenance of our well-being and survival. To reverse this ominous trajectory, we must transition toward a steady-state economy focused on qualitative development, as opposed to quantitative growth, and the interdependence of the human economy and global ecosphere. Developing policies and institutions for a steady-state economy will require us to revisit the question of the purpose and ends of the economy.

## The Economy as Subsystem of the Ecosphere

When I worked at the World Bank, I often heard the statement, “There is no conflict between economics and ecology. We can and must grow the economy and protect the environment at the same time.” I still hear it a lot today.

Although it is a comforting idea, it is at most half true. The “true” part stems from a confusion of reallocation with aggregate growth. Possibilities of better allocation almost always exist—more of something desired in exchange for a reduction in something less desired. However, aggregate growth, what macro-economists mean by the term “growth” (and the meaning in this essay), is that the total market value of all final goods and services (GDP) is expanding.

The economy, as shown in Figure 1, is an open subsystem of the larger ecosphere, which is finite, non-growing, and materially closed, although open to a continual, but non-growing, throughput of solar energy. When the economy grows in physical dimensions, it incorporates matter and energy from the rest of the ecosystem into itself. It must, by the law of conservation of matter and energy (First Law of Thermodynamics), encroach on the ecosystem, diverting matter from previous natural uses. More human economy (more people and commodities) means less natural ecosystem. In this sense, the statement that there is “no conflict” is false. There is an obvious physical conflict between the growth of the economy and the preservation of the environment.

It is the economy that is the part and needs to be integrated into the whole of the finite ecosphere.

That the economy is a subsystem of the ecosphere seems perhaps too obvious to emphasize. Yet the opposite view is common in high places. For example, a recent study by the British government’s Natural Capital Committee asserted, “The environment is part of the economy and needs to be properly integrated into it so that growth opportunities will not be missed.” To the contrary, it is the economy that is the part and needs to be integrated into the whole of the finite ecosphere so that growth limits will not be missed.<sup>1</sup>

But is this physical conflict economically important? Some believe that we still live in an “empty” world. In the empty world, the economy was small relative to the containing ecosystem, our technologies of extraction and harvesting were not very powerful, and our numbers were small. Fish reproduced faster than we could catch them, trees grew faster than we could harvest them, and minerals in the Earth’s crust were abundant. In other words, natural resources were not really scarce. In the empty world, it made economic sense to say that there was no conflict between economic growth and the ecosystem, even if it were not strictly true in a physical sense.

Neoclassical economic theory developed in the empty world and still embodies many assumptions from it.

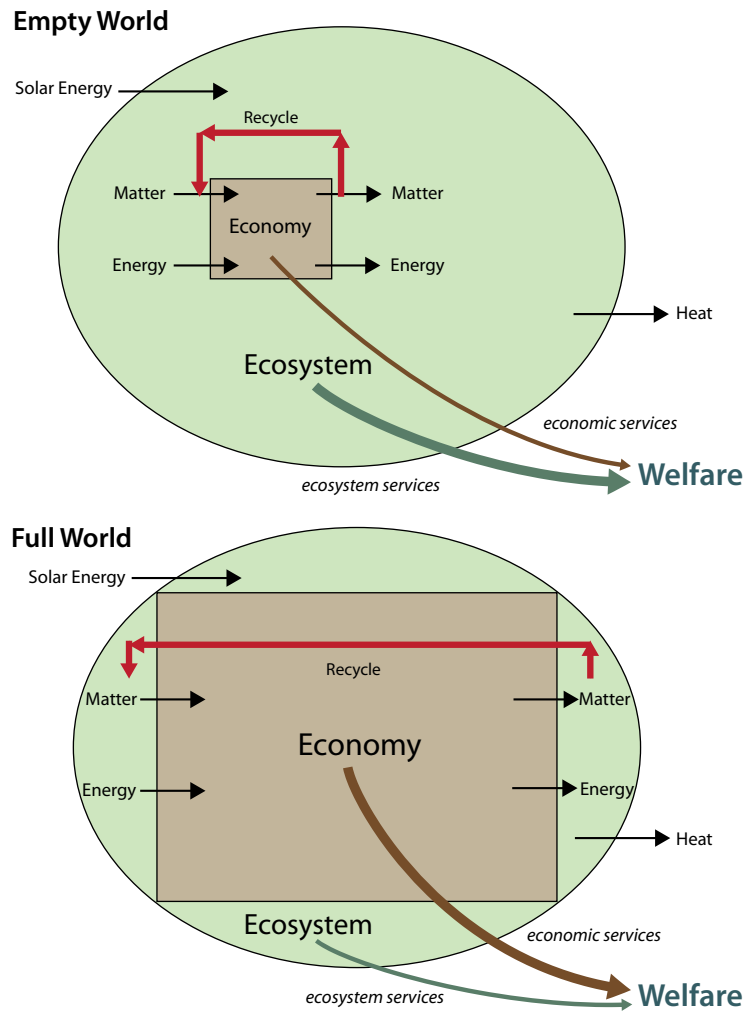


**Figure 1:** Welfare in a Full vs. Empty World

Neoclassical economic theory developed during this era and still embodies many assumptions from it. But the empty world has rapidly turned into a “full” world thanks to growth, the number one goal of all countries—capitalist, communist, or in-between. Since the mid-twentieth century, the world population has more than tripled—from two billion to over seven billion. The populations of cattle, chickens, pigs, and soybean plants and corn stalks have as well. The non-living populations of cars, buildings, refrigerators, and cell phones have grown even more rapidly. All these populations, both living and non-living, are what physicists call “dissipative structures”—that is, their maintenance and reproduction require a metabolic flow, a throughput that begins with depletion of low-entropy resources from the ecosphere and ends with the return of polluting, high-entropy waste back to the ecosphere. This disrupts the ecosphere at both ends, an unavoidable cost necessary for the production, maintenance, and reproduction of the stock of both people and wealth. Until recently, standard economic theory ignored the concept of metabolic throughput, and, even now, its importance is greatly downplayed.<sup>2</sup>

Ecological economists  
have distinguished  
growth from  
development.

The concept of metabolic throughput in economics brings with it the laws of thermodynamics, which are inconvenient to growthist ideology. The First Law, as noted above, imposes a quantitative trade-off of matter/energy between the environment and the economy. The Second Law, that the entropy (or disorder) of the universe is always increasing, imposes a qualitative degradation of the environment—by extracting low-entropy resources and returning high-entropy wastes. The Second Law of Thermodynamics thus imposes an additional conflict between expansion of the economy and preservation of the environment, namely that the order and structure of the economy is paid for by imposing disorder in the sustaining ecosphere. Furthermore, this disorder, exported from the economy, disrupts the complex ecological interdependencies of our life-supporting ecosystem.

Those who deny the conflict between growth and environment often claim that since GDP is measured in value units, it has no necessary physical impact on the environment. But one must remember that a dollar's worth of gasoline is a physical quantity—recently about one fourth of a gallon in the United States. GDP is an aggregate of all such “dollar's worth” quantities bought for final use, and is consequently a value-weighted index of physical quantities. GDP is certainly not perfectly correlated with resource throughput. Nevertheless, prospects for absolute “decoupling” of resource throughput from GDP are quite limited, even though much discussed and wished for.<sup>3</sup>

These limits are made visible by considering an input-output matrix for an economy. Nearly every sector requires inputs from, and provides outputs to, nearly every other sector. And these inputs require a further round of inputs for their production, etc. The economy grows as an integrated whole, not as a loose mix of sectors. Even the information and service sectors require substantial physical resource inputs. In addition to the supply side limit reflected in the input-output interdependence of production sectors, there is the demand side limit of what has been called the “lexicographic ordering of wants”—unless we first have sufficient food on the plate, we are just not interested in the information contained in a million recipes on the Internet. And, of course, the Jevons Paradox—the idea that, as technology progresses, the increase in efficiency with which a resource is used tends to increase the rate of consumption of that resource—negates much of the benefits of such progress. This does not deny real possibilities of improved technical efficiency in the use of resources, or ethical improvement in the ordering of our priorities. But these represent qualitative development and are frequently not captured in GDP, which mainly reflects quantitative growth.

Since GDP reflects both harmful and beneficial activity, ecological economists have not considered it to be a *desideratum* in itself. Instead, they have distinguished *growth* (quantitative increase in size by accretion or assimilation of matter) from *development* (qualitative improvement in design, technology, or ethical priorities). Ecological economists advocate *development without growth*—qualitative improvement without

quantitative increase in resource throughput beyond an ecologically sustainable scale. Given this distinction, one could indeed say that there is no necessary conflict between qualitative development and the environment. GDP accounting mixes together both growth and development, as well as costs and benefits. It thus confuses more than it clarifies.

## From Empty World to Full World: The Limiting Factor Has Changed

When the entropic throughput becomes too large, it overwhelms either the regenerative capacity of nature's sources or the assimilative capacity of nature's sinks. This tells us that we no longer live in the empty world, but instead inhabit a full world. Natural resource flows are now the scarce factor, and labor and capital stocks are now relatively abundant. This basic pattern of scarcity has been reversed by a century of growth.

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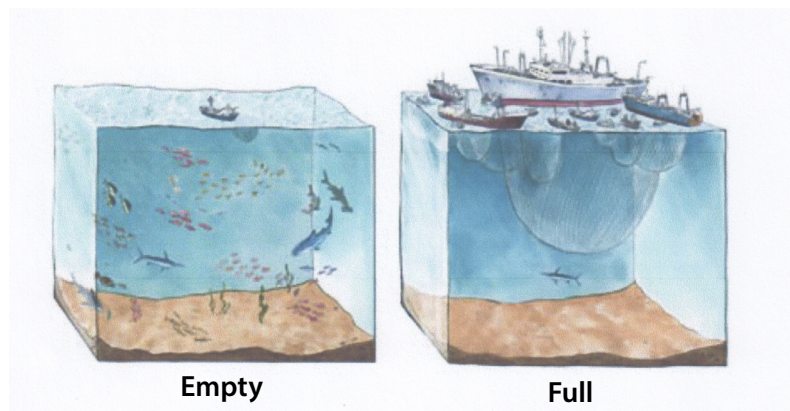


**Figure 2:** Change in Limiting Factors

This simple picture is instructive. In the past, the fish catch was limited by the number of fishing boats and fishermen. Now, it is limited by the number of fish and their capacity to reproduce. More fishing boats will not result in more caught fish. The limiting factor is no longer the manmade capital of boats, but the remaining natural capital of fish populations and their aquatic habitat.

Economic logic would tell us to invest in the limiting factor. The old economic policy of building more fishing boats is now uneconomic, so we need to invest in natural capital, the new limiting factor. How do we do that? For one, we can do so by reducing the catch to allow fish populations to increase to their previous levels, and by other measures such as fallowing agricultural land to refresh its fertility. More generally, we can do so through restoration ecology, biodiversity conservation, and sustainable use practices.

One could draw similar pictures for other natural resources. What ultimately limits the production of cut timber? Is it the number of chainsaws, sawmills, and lumberjacks, or the remaining forests and the growth rate of new trees? What limits the crops from irrigated agriculture? Is it the number of pipes, sprinklers, and pumps, or the stock

## Technologies cannot serve as direct substitutes for natural resources.

of water in aquifers, their recharge rate, and the flow of surface water in rivers? What limits the number of barrels of pumped crude oil: the number of drilling rigs or the remaining accessible deposits of petroleum? What limits the use of all fossil fuels: our mining equipment and combustion engines, or the capacity of the atmosphere to absorb the resulting greenhouse gasses without causing drastic climate change? In all cases, it is the latter, the natural capital (whether source or sink), rather than the manmade capital.

Traditional economists reacted to this change in the identity of the limiting factor in three ways. First, they ignored it—by continuing to believe that we live in the empty world of the past. Second, they pretended that GDP is an ethereal, angelic number rather than a physical aggregate. Third, they claimed that natural capital has not, in fact, replaced manmade capital as the limiting factor because manmade and natural capital are interchangeable substitutes, at least according to neoclassical production functions.

Only if factors of production are complements can the one in short supply be limiting. So even if natural capital is now scarcer than before, this would not be a problem, neoclassical economists say, because manmade capital is a “near perfect” substitute for natural resources. It is represented as such in multiplicative production functions such as the widely used Cobb-Douglas. But multiplying “factors” of production to get a “product” is mathematics, not economics. In the real world, what we call “production” is in fact transformation, not multiplication. Natural resources are transformed by capital and labor inputs into useful products and waste.

While improved technologies can certainly reduce waste and facilitate recycling, agents of transformation (capital and labor) cannot serve as direct substitutes for the material and energy being transformed (natural resources). Can we produce a ten-pound cake with only one pound of ingredients, simply by using more cooks and ovens? And further, how could we make more capital (or labor) without also using more natural resources? While a capital investment in sonar may help locate those remaining fish, it is hardly a good substitute for more fish in the sea. And what happens to the capital value of fishing boats, including their sonar, as the fish disappear?

## Limits to Growth and the Optimal Scale of the Economy in a Full World

It is clear from Figure 1 that the transition from empty to full world involves both costs and benefits. The brown arrow from Economy to Welfare represents economic services (benefits from the economy). It is small in the empty world but large in the full world. It grows at a diminishing rate because, as rational beings, we satisfy our most important wants first—the law of diminishing marginal utility. The costs of growth are represented by the shrinking ecosystem services (green arrow) that are large in the empty world but small in the full world. It diminishes at an increasing rate

as the ecosystem is displaced by the economy because we—in theory—sacrifice the least important ecosystem services first—the law of increasing marginal costs.

We can restate this in terms of Figure 3, showing the declining marginal benefit of growth of the economy and the increasing marginal cost of the resulting environmental sacrifice:

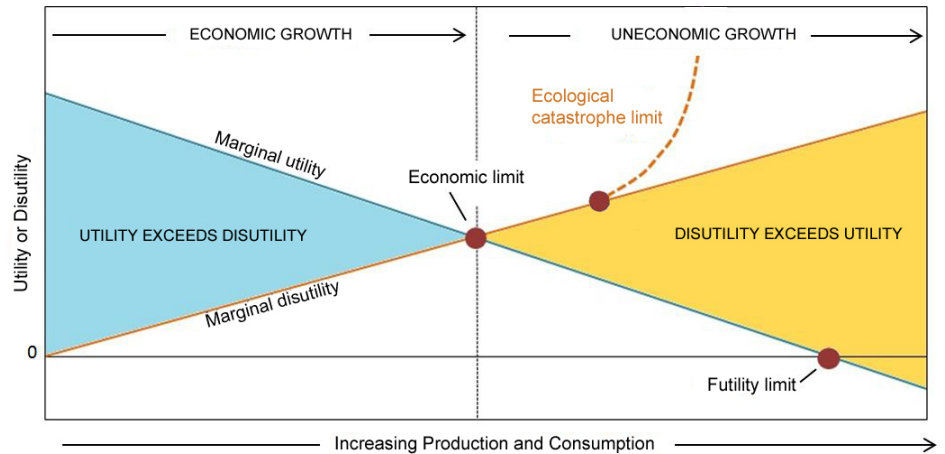


**Figure 3:** The Limits to Growth

From the diagram, we can distinguish three concepts of limits to growth:

1. The *futility limit* occurs when the marginal utility of production falls to zero. Even with no cost of production, there is a limit to how much we can consume and still enjoy it. There is a limit to how many goods we can enjoy in a given time period, as well as a limit to our stomachs and the sensory capacity of our nervous systems. In a world with considerable poverty, and in which the poor observe the very rich still enjoying their extra wealth, many view this futility limit as far away, not only for the poor, but for everyone. By its “non-satiety” postulate, neoclassical economics formally denies the concept of the futility limit. However, studies have shown that, beyond a “sufficiency threshold,” both self-evaluated happiness and objective indices of welfare cease to increase with GDP.<sup>4</sup>

2. The *ecological catastrophe limit* is represented by a sharp increase to the vertical of the marginal cost curve. Some human activity, or novel combination of activities, may induce a chain reaction, or tipping point, and collapse our ecological niche. The leading candidate for the catastrophe limit at present is runaway climate change induced by greenhouse gases emitted in pursuit of economic growth. Where along the horizontal axis it might occur is uncertain. The assumption of a continuously and smoothly increasing marginal cost curve is quite optimistic. Given our limited understanding of how the ecosystem functions, we cannot be sure that we have correctly sequenced our sacrifices of ecological services from least to most important. In making way for growth, we may ignorantly sacrifice a vital ecosystem service ahead of a trivial one. Thus, the marginal cost curve might in reality zigzag up and

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down discontinuously, making it difficult to define the third and most important limit, namely the economic limit.

3. The *economic limit* is defined by the equality of marginal cost and marginal benefit and the corresponding maximization of net benefit. The economic limit would appear to be the first limit encountered. It certainly occurs before the futility limit, and likely before the catastrophe limit. At worst, the catastrophe limit might coincide with and discontinuously determine the economic limit. Therefore, it is very important to estimate the risks of catastrophe and include them as costs counted in the disutility curve as far as possible.

From the graph, it is evident that increasing aggregate production and consumption is rightly called *economic* growth only up to the economic limit. Beyond that point, it becomes *uneconomic* growth because it increases costs by more than benefits, making us poorer, not richer. Nonetheless, we perversely continue to call it *economic* growth. Indeed, you will not find the term “uneconomic growth” in any macroeconomics textbook. Any increase in real GDP is called “economic growth” even if it increases costs faster than benefits. That richer (more net wealth) is better than poorer is a truism. The relevant question, though, is, does growth still make us richer, or has it begun to make us poorer by increasing “illth” faster than wealth?

Has growth begun  
to make us poorer by  
increasing “illth” faster  
than wealth?

Examples of “illth” are everywhere, even if they are still unmeasured in national accounts. They include things like nuclear wastes, climate change from excess carbon in the atmosphere, biodiversity loss, depleted mines, deforestation, eroded topsoil, dry wells and rivers, sea level rise, the dead zone in the Gulf of Mexico, gyres of plastic trash in the oceans, and the ozone hole. They also include exhausting and dangerous labor and the un-repayable debt from trying to push growth in the symbolic financial sector beyond what is possible in the real sector.

Economists will note that the logic employed in Figure 3 is familiar in microeconomics—the optimal size of a microeconomic unit, be it a firm or a household, occurs where the marginal cost is equal to the marginal benefit. That logic is not applied to the macro-economy, however, because the latter is thought to be the Whole rather than a Part. When a Part expands into the finite Whole, it imposes an opportunity cost on other Parts that must shrink to make room for it. When the Whole itself expands, it is thought to impose no opportunity cost because it displaces nothing, presumably expanding into the void. But as seen in Figure 1, the macro-economy is not the Whole. It, too, is a Part, a part of the larger natural economy, the ecosphere, and its growth does inflict opportunity costs on the finite Whole that must be counted. Their refusal to acknowledge this is why many economists cannot conceive of the possibility that growth in GDP could ever be uneconomic.

Standard economists might accept Figure 3 as a static picture but then argue that, in a dynamic world, technology will shift the marginal benefit curve upward and the marginal cost curve downward, moving their intersection (economic limit) ever to

the right, so that continual growth remains both desirable and possible. However, the macroeconomic curve-shifters need to remember three things. First, the physically growing macro-economy is still limited by its displacement of the finite ecosphere and by the entropic nature of its maintenance throughput. Second, the timing of new technology is uncertain. The expected technology may not be invented or come online until after we have passed the economic limit. Do we then endure uneconomic growth while waiting and hoping for the curves to shift? Third, the curves can also shift in the wrong directions, moving the economic limit back to the left. Did the technological “advances” of tetraethyl lead and chlorofluorocarbons shift the cost curve down or up? How about nuclear power? Or “fracking”?

Adopting a steady-state economy at the macro level helps us to avoid being shoved past the economic limit.

Adopting a steady-state economy at the macro level (while, of course, allowing for improvements in allocation at the micro level) helps us to avoid being shoved past the economic limit. We could take our time to evaluate new technologies rather than blindly adopting them in the interest of aggregate growth that may well be uneconomic. And the steady state gives us some insurance against the risks of ecological catastrophe that increase with growthism and technological impatience.

### Three Perspectives on Integrating Economy and Ecosystem

Our vision and policies should be based on an integrated view of the economy as a subsystem of the finite and non-growing ecosphere. Three different theoretical understandings have grounded such attempts at integration, and all three start from the vision of the economy as a subsystem of the ecosphere and thus recognize limits to growth. They differ, however, in the way they each treat the boundary between the economy and the rest of the ecosystem, and these differences have large policy consequences for how we adjust to limits.

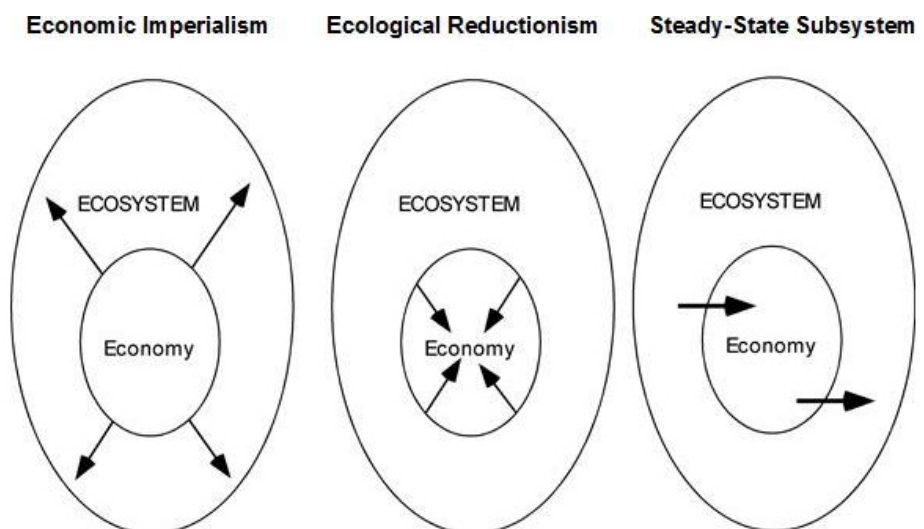


**Figure 4:** Approaches to Integrating Economy and Ecosystem

**Economic imperialism** seeks to expand the boundary of the economic subsystem until it encompasses the entire ecosphere. The goal is one system, the macro-economy as the Whole. This is accomplished by the complete internalization of all

Many of the costs of growth have come as surprises.

external costs and benefits into prices. Those myriad aspects of the biosphere not customarily traded in markets are treated as if they were by imputation of “shadow prices”—the economist’s best estimate of what the price of the function or thing would be if it were traded in a competitive market. Everything in the ecosphere is theoretically rendered comparable in terms of its priced ability to help or hinder individuals in satisfying their wants. Implicitly, the end pursued is an ever-greater level of consumption, and the way to effectively achieve this end is growth in the aggregate exchange value of marketed final goods and services (GDP).

Economic imperialism is essentially the neoclassical approach. Subjective individual preferences, however whimsical or uninstructed, are taken as the ultimate source of value. This is a perverse value judgment, not the absence of value judgments, as economists normally treat it. Since subjective wants are thought to be infinite in the aggregate, as well as sovereign, the scale of activities devoted to satisfying them tends to expand. The expansion is considered legitimate as long as “all costs are internalized into prices.”

While costs should certainly be internalized into prices, this should not become an excuse for allowing excessive takeover of the ecosphere by economic growth. Unfortunately, many of the costs of growth that we have experienced have come as surprises. We cannot internalize them if we cannot first imagine and foresee them. Furthermore, even after some external costs have become quite visible (e.g., climate change), internalization has been very slow, partial, and much resisted. Profit-maximizing firms have an incentive to externalize costs. As long as the evolutionary fitness of the environment to support life is not perceived by economists as a value, it is likely to be destroyed in the imperialistic quest to subject every molecule and photon in creation to the pecuniary rules of present value maximization.

There is no doubt that once the scale of the economy has grown to the point that formerly free environmental goods and services become scarce, it is better that they should have a positive price reflecting their scarcity than to continue to be priced at zero. But the prior question remains: Are we better off at the new larger scale with formerly free goods correctly priced, or at the old smaller scale with free goods also correctly priced (at zero)? In both cases, the prices are right. This question of optimal macro scale is neither answered nor even asked by either neoclassical or Keynesian economics in their blind quest for growth.

**Ecological reductionism** begins with the true insight that humans and markets are not exempt from the laws of nature. It then proceeds to the false inference that human action is totally explainable by and reducible to the laws of nature. It seeks to explain whatever happens within the economic subsystem by exactly the same natural laws that it applies to the rest of the ecosystem. It subsumes the economic subsystem indifferently into the natural system, erasing its boundary. Taken to the extreme, this view purports to explain everything by a materialist deterministic system that has no room for purpose or will. This is a sensible vision from which to study the

The steady-state perspective affirms both the difference and the interdependence between the human economy and natural ecosystem.

ecology of a coral reef or a rainforest. But if one adopts it for studying the human economy, one is stuck with the inconvenient policy implication that policy can make no difference.

Ecology has inherited from its parent discipline, biology, a measure of modern biology's mechanistic philosophy. This stems from a neo-Darwinian fundamentalism that is often uncritically accepted by many leading biologists as a deterministic metaphysics validated by science, rather than as a fruitful working hypothesis for doing science. Determinism is totally at odds with purposeful policy of any kind, and consequently with any economic thought aiming at policy. A happy marriage between economics and ecology, as in "ecological economics," must overcome this latent incompatibility. Economic imperialism reduces everything to human will and utility, neglecting objective constraints of the natural world. Ecological reductionism sees only deterministic natural laws, and imperiously extends these into materialist "explanations" of human will and consciousness as mere illusions. It is a tragic irony that the discipline whose scientific findings have done most to awaken us to the environmental dangers we face is also the discipline whose metaphysical presuppositions have done most to weaken our will to respond to these dangers through purposeful policy.<sup>5</sup>

Economic imperialism and ecological reductionism are both monistic visions, albeit rather opposite monisms. The monistic quest for a single entity or principle by which to explain everything leads to excessive reductionism on both sides. Certainly, science should strive for the most reduced or parsimonious explanation possible without ignoring the facts. But respect for the basic empirical facts of natural laws on the one hand, and self-conscious purpose and will on the other hand, should lead us to a kind of practical dualism. After all, that our world should consist of two fundamental features offers no greater inherent improbability than that it should rest on only one. How these two fundamental features of our world (material cause and final cause) interact is a venerable mystery—precisely the mystery that the monists of both kinds are seeking to avoid. But economists are too much in the middle of things to adopt either extreme. They are better off denying the tidy-mindedness of either monism than denying the facts that point to an untidy dualism.

The remaining perspective is the **steady-state subsystem**. It does not attempt to eliminate the subsystem boundary, either by expanding it to coincide with the whole system or by reducing it to nothing. Rather, it affirms both the interdependence and the qualitative difference between the human economy and the natural ecosystem. The boundary must be recognized and drawn in the right place. The scale of the human subsystem defined by the boundary has an optimum, and the throughput by which the ecosphere physically maintains and replenishes the economic subsystem must be ecologically sustainable. The goal of the economy is to minimize the low-entropy used up to attain a sufficient standard of living—by sifting it slowly and carefully through efficient technologies aimed at important purposes. The economy

should not be viewed as an idiot machine dedicated to maximizing waste. Its ultimate purpose is the maintenance and enjoyment of life for a long time (not forever) at a sufficient level of wealth for a good (not luxurious) life.

The idea of a steady-state economy comes from classical economics, and was most developed by John Stuart Mill (1857), who referred to it as the “stationary state.”<sup>6</sup> In such a state, the population and the capital stock would no longer grow, although the art of living would continue to improve. The constancy of these two physical stocks defined the scale of the economic subsystem. Birth rates would be equal to death rates and production rates equal to depreciation rates. Today, we add that both rates should be equal at low levels rather than high levels because we value longevity of people and durability of artifacts, and wish to minimize throughput, subject to maintenance of sufficient stocks for a good life.

## Policies for a Steady-State Economy

What policies can move us toward a steady-state economy?

Ecological economics should seek to develop the steady-state vision and get beyond the dead ends of both economic imperialism and ecological reductionism. Ten policies for moving toward a steady-state economy appear below. Many could be adopted independently and gradually, although they cohere in the sense that some compensate for the shortcomings of others. Of course, the question of the desired level of steady-state economy is crucial, and local, regional, and global ecological limits must be considered in fashioning effective policies.

**(1) Developing Cap-Auction-Trade systems for basic resources (especially fossil fuels):** Set caps for natural resource according to three key rules: (1) renewable resources should not be depleted faster than they regenerate, (2) nonrenewable resources should not be depleted faster than renewable substitutes are developed, and (3) wastes from all resource use should not be returned to the ecosystem faster than they can be absorbed and reconstituted by natural systems. This approach achieves sustainable scale and market efficiency, avoids rebound effects, and raises auction revenue for replacing regressive taxes.

**(2) Tax shifting:** Shift the tax base from “value added” (labor and capital) to that to which value is added, i.e., natural resource throughput, the source of social costs such as pollution and adverse public health effects. Such taxes will also encourage efficient resource use.

**(3) Limiting inequality:** Establish minimum and maximum income limits, maintaining differences large enough to preserve incentives but small enough to suppress the plutocratic tendencies of market economies.

**(4) Reforming the banking sector:** Move from a fractional reserve banking system to 100% reserve requirements on demand deposits. Money would no longer be mainly interest-bearing debt created by private banks, but non-interest-bearing government debt issued by the Treasury. Every dollar loaned for investment would

We should focus our limited capacity for global cooperation on those needs that truly require it.

be a dollar previously saved by someone else, restoring the classical balance between investment and abstinence from consumption, and dampening boom and bust cycles.

**(5) Managing trade for the public good:** Move from free trade and free capital mobility to balanced and regulated international trade. While the interdependence of national economies is inevitable, their integration into one global economy is not. Free trade undercuts domestic cost-internalization policies, leading to a race to the bottom. Free capital mobility invalidates the basic comparative advantage argument for free trade in goods.<sup>7</sup>

**(6) Expanding leisure time:** Reduce conventional work time in favor of part-time work, personal work, and leisure, thereby embracing well-being as a core metric of prosperity while reducing the drive for limitless production.

**(7) Stabilizing population:** Work toward a balance in which births plus in-migrants equals deaths plus out-migrants, and in which every birth is a wanted birth.

**(8) Reforming national accounts:** Separate GDP into a cost account and a benefits account so that throughput growth can be stopped when marginal costs equal marginal benefits.

**(9) Restoring full employment:** Restore the US Full Employment Act of 1945 and its equivalent in other nations in order to make full employment once again the end, and economic growth the temporary means. Un/under-employment is the price we pay for growth from automation, off-shoring, deregulated trade, and a cheap-labor immigration policy. Under steady-state conditions, productivity improvements would lead to expanded leisure time rather than unemployment.

**(10) Advancing just global governance:** Seek world community as a federation of national communities, not the dissolution of nations into a single “world without borders.” Globalization by free trade, free capital mobility, and free migration dissolves national community, leaving nothing to federate. Such globalization is individualism writ large—a post-national corporate feudalism in a global commons. Instead, strengthen the original Bretton Woods vision of interdependent national economies, and resist the WTO vision of a single integrated global economy. Respect the principle of subsidiarity: although climate change and arms control require global institutions, basic law enforcement and infrastructure maintenance remain local issues. Focus our limited capacity for global cooperation on those needs and functions that truly require it.

## Larger Ethical and Ecological Context of Economics

It is one thing to suggest a general outline of policies, but it is something else entirely to say how we will secure the will, strength, and clarity of purpose to carry out these policies—especially when we have treated growth as the *summum bonum* for the

past century. Such will requires a major change in philosophical vision and ethical practice, a shift that is hardly guaranteed even in light of the increasingly perilous circumstances in which the planet finds itself.

As a way to contemplate such a change, consider the “ends-means pyramid” in Figure 5. The policies suggested above belong in the middle, under “Political Economy.” At the base of the pyramid are our ultimate means (low-entropy matter-energy)—that which we require to satisfy our wants, but which we cannot make, only use up. We use these ultimate means directly, guided by technology, to produce intermediate means (e.g., artifacts, commodities, services) that directly satisfy our needs. These intermediate means are allocated by political economy to serve our intermediate ends (e.g., health, comfort, education), ethically ranked by how strongly they contribute to the Ultimate End under existing circumstances. We can perceive the Ultimate End only vaguely, but in order to ethically rank our intermediate ends, we must compare them to some ultimate criterion. We cannot avoid philosophical and theological inquiry into the Ultimate End just because it is difficult. To prioritize requires that something go in first place.

We can perceive the Ultimate End only vaguely.

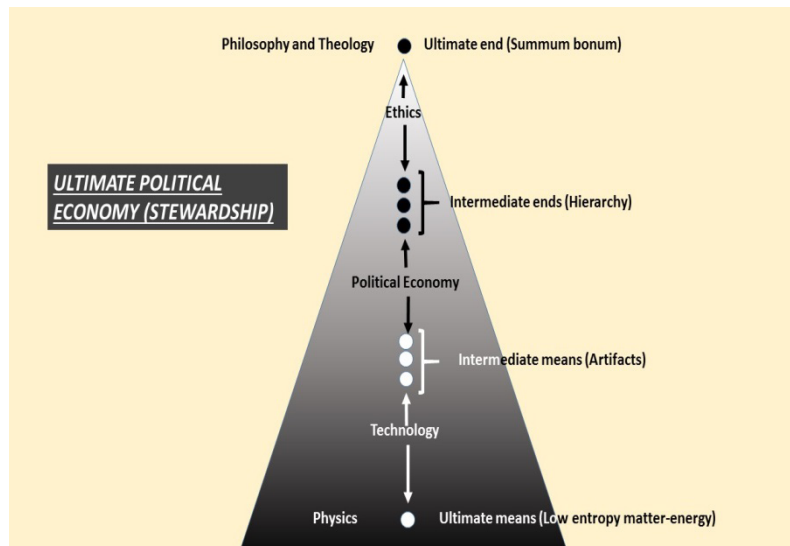


**Figure 5:** An Ends-Means Pyramid of Human Activity

The middle position of economics is significant. Economics traditionally deals with the allocation of *given* intermediate means to satisfy a *given* hierarchy of intermediate ends. It takes the technological problem of converting ultimate means into intermediate means and the ethical problem of ranking intermediate ends with reference to an Ultimate End as solved. All economics has to do, then, is efficiently allocate given means among a given hierarchy of ends. In neglecting the Ultimate End and ethics, economics has been too materialistic; in neglecting ultimate physical means and technology, it has not been materialistic enough.

Ultimate political economy (stewardship) is the total problem of using ultimate means to best serve the Ultimate End, no longer taking technology and ethics as given,

but as steps in the total problem to be solved. The overall problem is too large to be tackled without breaking it down into its pieces. But without a vision of the total problem, the pieces do not fit together.

The dark base of the pyramid represents the relatively solid and consensual knowledge of various sources of low-entropy matter-energy. The light apex of the pyramid represents the fact that our knowledge of the Ultimate End is uncertain and not nearly as consensual as physics. The single apex will annoy pluralists who think that there are many “ultimate ends.” Grammatically and logically, however, “ultimate” requires the singular. Yet there is certainly room for more than one perception of the nature of the singular Ultimate End, and much need for tolerance and patience in reasoning together about it.

A better starting point for reasoning together is that “there is no wealth but life.”

The Ultimate End, whatever it may be, cannot be growth. A better starting point for reasoning together is John Ruskin’s aphorism that “there is no wealth but life.” How might that insight be restated as an economic policy goal? I would suggest the following: maximizing the cumulative number of lives ever to be lived over time at a level of per capita wealth sufficient for a good life. This leaves open the traditional ethical question of what is a good life, while conditioning its answer to the realities of ecology and the economics of sufficiency. At a minimum, it seems a more reasonable approximation than the current impossible goal of “ever more things for ever more people forever.”

## Endnotes

1. Dieter Helm, *The State of Natural Capital: Restoring our Natural Assets* (London: UK Natural Capital Committee, 2014).
2. This is despite notable contributions from Nicholas Georgescu-Roegen and Kenneth Boulding. See Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, MA: Harvard University Press, 1971); Kenneth Boulding, “The Economics of the Coming Spaceship Earth,” in *Environmental Quality in a Growing Economy*, ed. H. Jarrett (Baltimore: Johns Hopkins University Press, 1966), 3-14.
3. Tim Jackson, *Prosperity without Growth: Economics for a Finite Planet* (London: Earthscan, 2009), 67-71.
4. As indicated by the GPI (Genuine Progress Indicator) and its forerunner the ISEW (Index of Sustainable Economic Welfare). For an informative survey, see Ida Kubiszewski, Robert Costanza, Carol Franco, Philip Lawn, John Talberth, Tim Jackson, and Camille Aylmer, “Beyond GDP: Measuring and Achieving Global Genuine Progress,” *Ecological Economics* 93 (September 2013): 57-68.
5. This contradiction is most apparent in the work of acclaimed naturalist and environmentalist Edward O. Wilson, who strongly affirms both materialistic determinism and environmental activism. He recognizes the contradiction and, unable to resolve it, has simply chosen to live with it. See Wendell Berry, *Life is a Miracle (An Essay Against Modern Superstition)* (Washington, DC: Counterpoint Press, 2000), 26. See also Chapter 23 in Herman Daly, *Ecological Economics and Sustainable Development* (Cheltenham, UK: Edward Elgar, 2007).
6. John Stuart Mill, *Principles of Political Economy* IV.VII.I (London, 1848).
7. Capitalists are interested in maximizing absolute profits and therefore seek to minimize absolute costs. If capital is mobile between nations, it will move to the nation with lowest absolute costs. Only if capital is internationally immobile will capitalists bother to compare internal cost ratios of countries and choose to specialize in the domestic products having the lowest relative cost compared to other nations, and to trade that good (in which they have a *comparative advantage*) for other goods. In other words, comparative advantage is a second-best policy that capitalists will follow only when the first-best policy of following absolute advantage is blocked by international capital immobility. For more on this, see Chapter 18 in Herman Daly and Joshua Farley, *Ecological Economics* (Washington, DC: Island Press, 2004).

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## About the Author



Herman Daly was an ecological economist and Emeritus Professor at the University of Maryland, School of Public Policy. From 1988 to 1994, he was a Senior Economist in the Environment Department of the World Bank. Prior to that, he was a professor of economics at Louisiana State University, where he taught for twenty years. He was co-founder and associate editor of the journal *Ecological Economics*. He wrote extensively on theorizing the steady-state economy and co-developed the Index of Sustainable Welfare. He held a Ph.D. from Vanderbilt University.

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# Roundtable



## John Barry

Herman Daly invites us to ask the most fundamental question of all—What is the economy for?—and then to ask what conceptual tools we need to analyze the economy once we have answered the first question. His essay also poses an even more challenging question: What if the economic problems we face in those parts of the world suffering from “uneconomic growth” (to use Daly’s evocative term) are not ones to be addressed by more production and consumption and productivity gains as conventionally viewed? What if our economic issues can be better addressed by looking at them as, in part, problems of excess demand/consumption and not insufficient supply? And additionally through looking at redistribution and equalizing consumption?

The idea of undifferentiated economic growth (GDP) as a permanent feature of the economy, as opposed to a historically necessary but analytically contingent feature of understanding the economy, is the moot issue. We need to dispel some understandings about “post-growth” political economic thinking. First, it does not mean no growth in the majority world. In the full world described by Daly, a condition for the development of the majority world, via economic growth in part, is the reduction in economic growth in the unsustainable minority world. Second, “no-growth” at the aggregate level is compatible with growth within different sectors of the economy—a reallocation of resources as Daly puts it, e.g., more public libraries and growth in public transport rather than private car ownership and use. Third, a post-growth political economy does not mean an end to development, prosperity, progress, and human flourishing. Finally, being post-growth does not make one blind to more progressive forms of growth such as pro-poor growth, growth with egalitarian welfare policies such as a living wage, or indeed “green growth” of the low-carbon sort promoted under various policy proposals ranging from the Green New Deal, sustainable growth policies of the European Union. However, the



incontrovertible empirical reality, but one that is extremely politically inconvenient, is that in the full world described by Daly, we have to move our economic imaginary beyond undifferentiated economic growth as a permanent feature of the economy.

My own work and thinking on this topic for over two decades has convinced me that undifferentiated economic growth as a permanent feature of the economy is an ideology, and an ideology which serves elite interests in both disciplining populations and especially in removing the issue of socio-economic redistribution and inequality from the political agenda.

Indeed, and taking inspiration from authors such as Daly and other contemporary “heterodox political economists” such as Tim Jackson, Molly Scott-Cato, Juliet Schor, Peter Victor, and Giogios Kallis (as well as older thinkers like Nicholas Georgescu-Roegen, Ivan Illich, Karl Polanyi, and E.F. Schumacher), my own suggestion for moving beyond undifferentiated economic growth as a permanent feature of the economy rests on the following three criterion or tests for any economic policy or strategy:

1. Does it increase or decrease carbon intensity, resource use, and pollution?
2. Does it increase or decrease socio-economic inequalities?
3. Does it increase or decrease qualitative measures of human flourishing?

And this is why Daly’s essay and others that point out that the neoclassical economic growth “emperor has no clothes” are an invitation for economics to return to its roots in “political economy” and integrate political, democratic, as well as ethical and normative dimensions within how we think about and design policies and institutions for the creation and sustaining of the human metabolism with nature that is the human economy.

A significant issue at the heart of our problems is measurement and the use and dominance of GDP. After all, what gets measured gets done. Apart from the well-known problems of GDP as a measure of social welfare (not differentiating “goods” from “bads” primary among them), GDP



since its creation in the interwar and post-war period has enabled thinking about the economy to become separated from the “real fundamentals” of the human economy, namely the natural world. As GDP is just a monetary figure, one could be seduced into thinking that as monetary measures can grow infinitely (“angelic” in Daly’s terminology or “noumenal” in the older language of Immanuel Kant), economic growth can equally infinitely grow beyond the biophysical limits of the planet. But given that money is a claim on resources/goods, unless we can eat inflation, and unless we simply view monetary increases in the value of economic activity as the object of economic growth, this monetized conception of GDP is a form of double think. It presents the phenomenal (in Kantian terms) or “throughput/resources/energy/pollution” (in Daly’s) as noumenal.

For elites, the increase in the monetized value of assets/economic exchange brings power (to the extent that it is both a claim on resources/the diminishing fruits of economic growth and part of an ideology which disciplines and organizes populations). For ordinary citizens, what matters is actual bread, electricity, and transport/mobility, not the monetized value. This is why ordinary citizens (unlike elites in the state, academic, corporate, and media worlds) are not concerned about abstract measurements or movements in GDP-measured “economic growth.” Working people are concerned about declines in economic growth because of their concerns with unemployment, not with GDP achieving a 3% annual increase. It is this difference which explains the relief of elites when “jobless growth” can be announced. Daly and others raise a key point: Why do we not see these elites promoting job-rich strategies in which economic growth is not the objective? Where do we find policies and op-eds extolling the urgent need to improve the energy or resource efficiency not of production but of human well-being and human flourishing?

For example, my own suggestions are for a transition away from “buildings, banks, and boutiques”—which I use as shorthand for property speculation/homes as assets, the growth of the financial sector relative to the real economy, and debt-based consumerism, which



together constitute the dominant failed economic model. These are the key features of our failed economic growth system that so spectacularly crashed in 2007-8 and to which almost all governments and, it has to be said, populations seek to return (though perhaps with some more—albeit—light financial regulation). So instead of trying, like Dorothy in the Wizard of Oz clicking her ruby red slippers, to say “there’s no place like pre-2007,” Daly and other “green political economists” invite us to imagine a new economic vision. So instead of “buildings, banks, and boutiques,” why not “libraries, laundromats, and light rail”? Instead of a return to an economic system based on private debt-based ownership of goods and services, why not one based on forms of sharing and collective as opposed to private consumption? One where the management and use of real assets, rather than finance, are the basis of the economy?

Perhaps much like how the road to hell is paved with good intentions, the pursuit of economic growth has (in part and in the past) been motivated by progressive ideas. Who cannot welcome and celebrate the historical achievements of economic growth over the past century in terms of improved health, public sanitation, and the deployment of technology to reduce arduous labor, raise living standards, etc.? But, as astute observers from John Stuart Mill to Herman Daly have pointed out, we in the over/mal-developed minority world need to attend to thresholds (e.g., for carbon/resources/pollution or levels of inequality) as well as trajectories. Richard Wilkinson and Kate Pickett explained this well in their book *The Spirit Level*:

Economic growth, for so long the great engine of progress, has, in the rich countries, largely finished its work. Not only have measures of well-being and happiness ceased to rise with economic growth but, as affluent societies have grown richer, there have been long-term rises in rates of anxiety, depression, and numerous other social problems. The populations of rich countries have got to the end of a long historical journey.<sup>1</sup>

There seems to be a growing consensus within green political economy around the need to move beyond orthodox GDP undifferentiated economic growth as a permanent feature of the economy. Like the consensus in the scientific community around anthropogenic climate change,



it finds itself an inconvenient truth in terms of the large gap between intellectual/empirical plausibility and political/policy implementation. How do you sell a steady-state economy? That is, how do you present the vision and narrative of green political economy in a way that is appealing and likely to garner public support?

This seems to me to be the question and one perhaps worthy of a future debate. But, for now, let me finish with a suggestion. I think there is some potential in replacing “economic growth” with alternatives such as the International Labour Organization’s concept of “economic security.” The ILO report defines economic security as “composed of basic social security, defined by access to basic needs, infrastructure pertaining to health, education, dwelling, information, and social protection, as well as work-related security.”<sup>2</sup>

Tellingly, the report continued,

People in countries that provide citizens with a high level of economic security have a higher level of happiness on average, as measured by surveys of national levels of life-satisfaction and happiness....The most important determinant of national happiness is not income level—there is a positive association, but rising income seems to have little effect as wealthy countries grow more wealthier. Rather the key factor is the extent of income security, measured in terms of income protection and a low degree of income inequality.<sup>3</sup>

Whether linked to notions of Maslow’s hierarchy of needs; interests in security (witness the emergence of “energy security”); welfare state notions of social protection and provision of needs; or a shift towards holistic notions of human flourishing, well-being, and quality of life, economic security in such anxious times as ours, with heightened socioeconomic “insecurity” and growing employment precariousness, may find resonance with publics in a way to challenge the dominant ideological “common sense” of “a return to economic growth.”



However, whether it is “economic security,” “degrowth,” “prosperity or development without growth,” the “steady-state economy,” or even “sustainable development” itself, it is clear that what “post-growth” politics needs is a compelling narrative that attaches to peoples’ needs, aspirations, and values, and this can only be done by democratizing this challenge and the search for alternative economic models and associated alternative economics. The challenge is in large part one of competing visions. It is an old adage that “without vision the people perish.” However, it is precisely with the dominance of this economic growth vision and myth that human and nonhuman perishing, needless suffering, and blighted life chances will result as opposed to equitable flourishing. What we need are new economic visions of the type eloquently outlined in Herman Daly’s essay. And while the entire “post-economic growth” political project is indeterminate and asks more questions than it has answers for, we can do no better than to begin this inquiry into a new economy for the twenty-first century than by asking that fundamental question: What is the economy for?

### Endnotes

1. Richard Wilkinson and Kate Pickett, *The Spirit Level: Why More Equal Societies Almost Always Do Better* (London: Allen Lane, 2009), 5-6.
2. International Labour Organization, *Economic Security for a Better World* (Geneva: ILO, 2004), 1, [http://www.ilo.org/public/english/protection/ses/info/publ/economic\\_security.htm](http://www.ilo.org/public/english/protection/ses/info/publ/economic_security.htm).
3. Op cit.



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### About the Author



John Barry is Professor of Green Political Economy at Queens University Belfast. His areas of research include green economics, normative aspects of the transition from unsustainability, green political theory, governance for sustainability transitions, the greening of citizenship and civic republicanism, and climate change and energy security politics, policy, and political economy. His books include *Rethinking Green Politics: Nature, Virtue and Progress* and *Environment and Social Theory*. His co-edited books include *Sustaining Liberal Democracy, Europe, Globalisation and Sustainability*, *The Nation-State and the Global Ecological Crisis*, *Contemporary Environmental Politics*, and *Environmental Philosophy: The Art of Living in a World of Limits*. His latest book is *The Politics of Actually Existing Unsustainability: Human Flourishing in a Climate-Changed, Carbon-Constrained World*. His current research project is "Beyond Economic Growth: Political, Ethical and Cultural Dimensions of Post-Growth Green Political Economy."

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## Nancy Folbre

I come to this as a friendly outsider, not an ecological economist, but as a feminist political economist critical of mainstream economics, neoclassical theory, and conventional definitions of GDP.

While I agree with much of what Daly says, I will focus on one disagreement where I hope I can add some value.

I don't like the "full" vs. "empty" metaphor. It reminds me of a gas tank (except in this case, full is bad, and empty is good).

Much depends on what particular tank, bottle—or, more broadly, what conceptual space—one is referring to. Growth can be defined in many ways, and it is ironic that the definition implicit here—increase in the number of humans and the stuff they produce and consume—invokes a very traditional notion of GDP as material output.

As [Robin Hahnel](#) puts it, "A good place to start is by asking precisely what it is that is growing, because often people are not talking about the same thing at all."

I study primarily services—services of care for others. We can increase both the quantity and the quality of services we provide for others without "filling up" any more space. I also think we can improve our ability to share existing resources and services in efficient and equitable ways, enabling a growth in consumption independent of growth in production. We can consume things other than "stuff."

Yes, current forms of economic growth are ecologically unsustainable. But this is due not only to filling up space or using up resources, but also to disruption and destabilization of ecological



services. “Stuff” is important, but it is not everything. Consider the potential to completely destroy our ecosystem with nuclear war or genetic engineering gone awry.

Daly asks, “Can we produce a ten-pound cake with only one pound of ingredients, simply by using more cooks and ovens?” I love this question, which reminds us that substitutability is limited by taking us into the kitchen. But we do not have to keep living on cake. We can and should find other ways of sustaining ourselves. This will require growth—growth in creativity, in commitment, and in valuable services to others, even as we try to reduce our physical “throughput.”

The fact that I dislike the “full versus empty” metaphor does not mean that I disagree with Daly’s general perspective. In fact, he’s worth at least a million neoclassical economists (which is probably more than actually exist today). Furthermore, he takes up a lot less space.

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### About the Author



Nancy Folbre is Director of the Program on Gender and Care Work at the Political Economy Research Institute at the University of Massachusetts Amherst and a Senior Fellow of the Levy Institute at Bard College. Her research explores the interface between political economy and feminist theory, with a particular emphasis on the value of unpaid care work. In addition to numerous articles published in academic journals, she is the editor of *For Love and Money: Care Work in the U.S.*, and the author of *Greed, Lust, and Gender: A History of Economic Ideas*, *Valuing Children: Rethinking the Economics of the Family*, and *The Invisible Heart: Economics and Family Values*. She has also written widely for a popular audience, including contributions to the *New York Times* Economix blog, *The Nation*, and the *American Prospect*.

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## Tim Jackson

I remember vividly the first time I came across Herman Daly's work. It was in a crowded upstairs meeting room in London sometime in 1989 during a presentation on the relative costs of different carbon abatement options. Among the slides on display—acetates and overhead projectors in those days—was one showing Herman Daly and John Cobb's Index of Sustainable Economic Welfare alongside the GDP. It fascinated me not simply because it illustrated so clearly Daly's concept of uneconomic growth, but also because it proved to me that it was possible to think in economic terms about economics without falling prey to common ecological follies such as the idea that economic growth is unequivocally good (or indeed even possible in perpetuity on a finite planet).

Together with Nic Marks, I set out to replicate the ISEW for the UK and very soon after that, at the request of the Stockholm Environment Institute, for Sweden. Both examples confirmed the findings of the US ISEW, as did many others for different countries since: uneconomic growth is not just a theoretical construct; it is a quantifiable present reality.

But the exercise also underlined something else for me. Economists didn't much like it. Even the friendliest ones found all sorts of reasons to rubbish the exercise—some of them of course with more than a grain of truth. It was always painfully obvious to us that the statistical basis for a real measurement of the environmental and social costs of economic activity is woefully inadequate. And besides, in the ISEW, we were also being asked to put monetary values on all sorts of things, which resisted a robust monetary valuation. Ultimately of course, as many have pointed out, some things just cannot be valued in money terms and we probably should not even try.

Nonetheless, this exercise like so much of Daly's work stands out precisely because of his refusal to stop thinking. Thinking clearly. Thinking even when the answers are inherently difficult to



come by. The easiest thing in the world to do, when you have discovered near fatal flaws at the heart of the most influential scientific discipline of our times, would be to reject that discipline in its entirety.

Many people do reject economics. Many of my students come to me with absolutely no wish at all to have anything to do with a subject that they feel has failed so many, so spectacularly. Some of their reasons are good. Economics has let us down on all sorts of counts, not least of course in providing a robust understanding of economic instability. Economists have often been more arrogant than they should have been, swept away by their own secular importance, rather than being persuaded, as Keynes once exhorted them, to become a bit more like dentists, providing a vital service in terms of our economic health, but otherwise maintaining a relatively low profile.

The extent to which this rejection of economics per se has become an acceptable intellectual position never ceases to surprise me. At a conference recently, after I had presented some economic analysis of a stationary state economy, I was approached by one of the most prominent advocates of the degrowth movement. In my opinion, he told me, the idea of post-growth economics is an oxymoron.

This is why Herman Daly's work matters so much: despite the flaws of the particular economic paradigm in which we are currently embedded, he refuses to give up on economics, on an economic way of thinking about society. He applies a ruthless rigor to it, which is often sadly missing in his more orthodox counterparts, and in doing so, he points us towards solutions. Not all the work is done, for sure. But the vision that he presents is a valuable, sophisticated and important one. When it comes to a comparison between Daly's steady-state economics and conventional economics, there is no contest.

Three specific issues struck me as I read Daly's essay and the responses to it.



1) Political will for change: On page 12 of his essay, Daly accepts that articulating a “general outline” of policies by no means guarantees the political will to enact them. For some people, the lack of political will is proof of the corruption and vested interest at the heart of contemporary government; for others, it is evidence that “we” just haven’t made our case clearly enough, forcefully enough, or attractively enough. I have a slightly different take on this. There is of course a kind of nonsensical political resistance to even thinking about alternatives to a growth-based paradigm. This much is true. But there are also good reasons for politicians to be wary of such a change. Keynes once said that the principal objective of the economy is to maintain social stability. If social stability depends on economic stability (it broadly seems to) and economic stability depends on growth (Keynes certainly thought that it did), then perhaps after all the government’s relentless pursuit of growth is a bit more understandable—even where it becomes uneconomic. True, the pursuit of growth can also lead to instability, as we saw only too clearly in the crisis. But the examples of social instability from economic decline are legion: Russia, Greece, Germany in the interwar years, etc. There are one or two exceptions: Cuba turned round better well-being outcomes following the collapse of the Soviet Union in spite of desperate economic circumstances. But they tend to be the exception rather than the rule. Degrowth advocates insist that “their recession is not our degrowth.” But more needs to be done to flesh out this aspiration in a meaningful way. Politicians are right to seek some form of convincing that a steady state economy or a degrowth economy will not lead to collapse. When economies collapse, bad things happen. There is an urgent need here for more work. We do need a post-growth economics whatever the degrowth advocates say. We need to be prepared to engage in thorough, robust, peer-reviewed economic analysis—even if we don’t entirely trust the language within which (for now) we have to work.

2) Labor and productivity: I like Herman Daly’s take on full employment. One of his ten commandments is to bring back the US Full Employment Act. Hyman Minsky had a similar idea to make government employer of last resort. These are profoundly sensible ways of approaching



the question of employment under steady-state conditions. But the pursuit of labor productivity is what lies at the root of the problem of maintaining employment in a stationary or declining economy. Daly is relatively pragmatic about this, if a little offhand. Labor productivity gains should be taken, he says, as a reduction in working hours. The New Economics Foundation and many others have taken a similar line. Let's reduce working time and thereby solve the problem of employment. It does make perfect sense, but arithmetically, there is also another option on the table: let's be less productive.

You can maintain much more employment even with declining output if you are not continually chasing labor productivity. There are places where labor productivity growth makes sense. No one much enjoys washing sheets by hand and mixing concrete with a spade. But when it comes to human services, continually stripping out the time spent in service actually becomes (in any meaningful terms) counter-productive, even though it is counted in economics as being productive. Some things can and should still grow. The services that improve the quality of our lives—health, education, social care, renovation, refurbishment—might all fall into this category. These are activities where the value of the output is intimately related to the time that people put into it. The same is true of craft; it is the hours spent in perfecting labor that yields the value in a crafted product. And it is true of culture. What is the point (to borrow from William Baumol) of having the New York Philharmonic play Beethoven's Fifth Symphony faster and faster each year? There is a set of activities—care, craft, culture—where the relentless pursuit of labor productivity stops making sense. This is a profoundly challenging point for economics, for two reasons. Firstly, it undercuts the broad principle of input cost minimization as a good thing. Secondly, it raises serious questions about inequality: the best way to prevent a slide in the wage-profit split is for labor productivity to increase. There are ways around these challenges, but again they require us to do hard work on economic structure.

3) Finally, a word about Ultimate Ends. My one disagreement with Daly's essay concerns the discussion on Ultimate Ends—specifically, the appeal to grammar I found unconvincing.



What makes Ends ultimate is not that they are singular, but that they are goods which are not held to be the means to some other end. To be honest, I am not even convinced that Daly really agrees with this characterization, because earlier in the essay he set out a much more convincing goal for economic activity in which he called for reductions in the entropy used to achieve “a sufficient standard of living—by sifting it slowly through efficient technologies aimed at important purposes.” The efficient technology part of this, of course, could come from any eco-modernist out there calling for green growth. The “important purposes” part is much more telling. It remains unexplored in this essay, but, to my mind, it is rightly plural. Others have explored these “important purposes” in more detail. Sen and Nussbaum’s work has been mentioned in discussion, and, to my mind, they remain at the forefront of those who have thought carefully about the question of economic ends. Both take pluralistic approaches, and my own sense is that this is correct. Singular quantities of satisfied life years are not going to get us to a nuanced understanding of human aspiration or societal progress. We need to identify qualities which we can legitimately claim as indicators of progress. Our economics should clearly serve these qualities, exactly as this essay suggests, rather than being seen as an end in itself. But the days of insisting on the predominance of a single numerical indicator should be definitively over. No one has done more to convince me of that than Herman Daly has.

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### About the Author



Tim Jackson is an ecological economist and writer. Since 2016, he has been Director of the Centre for the Understanding of Sustainable Prosperity (CUSP) at the University of Surrey in the UK, where he is also Professor of Sustainable Development. From 2004 to 2011, he was Economics Commissioner for the UK Sustainable Development Commission, where his work culminated in the publication of *Prosperity without Growth* (2009/2017), which was subsequently translated into 17 foreign languages. His latest book *Post Growth – Life after Capitalism* was published by Polity Press in 2021. Jackson holds degrees in mathematics (MA, Cambridge), philosophy (MA, Uni Western Ontario) and physics (PhD, St Andrews). He is a Fellow of the Royal Society for the Arts, the Academy of Social Sciences and the Belgian Royal Academy of Science. In addition to his academic work, he is an award-winning dramatist with numerous radio-writing credits for the BBC.



## Giorgos Kallis

It was a pleasure reading this essay.

Together with Johan Rockström's "[Bounding the Planetary Future](#)" and, may I say, my own "[The Degrowth Alternative](#)," we have three essays which, complementing one another in their diversity, make a strong case for limiting growth and searching for alternatives for prospering without growth. For those of us trained in ecological economics, Herman Daly's work remains the reference, the "textbook" from which we learn about the fallacies of mainstream economics. And as this essay demonstrates, his theoretical framework remains as strong as ever, a powerful antidote to the "empty world" fantasy of mainstream economics, where there are only firms and consumers, endlessly circulating an ever-growing amount of goods and services.

Daly's ten policies are innovative and open up an alternative intellectual ground in a public debate stuck between austerity on the one hand and stimulus on the other, both of them predicated on relaunching growth.

Finally, I enjoyed that the essay did not shy, as most modern economists do, from engaging with philosophical questions, interrogating the ultimate meaning to which economic activity is to contribute.

But I have also three points of which I am less convinced and which raise questions with which I am also confronted when defending degrowth.

First, I am not convinced by Daly's insistence on the term "development." Ever since the Truman doctrine, development has been associated with an imaginary of colonized nations "catching up" and becoming like their colonizers "ahead." GDP leagues of tables, and processes of capital accumulation and technological innovation, are at the heart of both growth and what has come



to be known as “economic development.” Development and growth are so intertwined that in some languages, such as my native Greek, they are expressed by the same word. Development without an ultimate end is pursuing what can be pursued, which is what is wrong with growth. I would prefer therefore the use of different, more qualitative, and less historically loaded terms, such as “flourishing” instead of developing, or “prosperity” without growth, instead of development without growth.

Second, Daly maintains the, problematic in my view, distinction in economics between positive and normative analysis. His proposals are addressed implicitly to some “benevolent” policymaker, supposedly willing to find the optimal way for maximizing the public good. We know that there are no such policymakers, and that even the more radical governments or electorates are worlds apart from the spirit or details of the ten proposals. I am keen to hear how Daly sees the “political economy” and the social and political dynamic through which his proposed policies may plausibly be realized. This is a normative point, but one informed by political-economic or sociological analysis. I would like to hear from him what type of governments he imagines implementing his ten policies and how and where does he see them coming to power. I am also interested on questions of global governance, and why and how any single nation could take the lead in imposing caps in its emissions or top incomes without destructive capital flight.

Also, and in relation, I am interested in what has changed politically and why, since the first time he started writing about steady-state economics. If something, the 1970s were a much more favorable era for our ideas. President Johnson was contemplating a future without growth, and the European Commissioner Sicco Mansholt was calling for zero growth. The Italian Eurocommunists had “revolutionary sobriety” at the heart of their agenda, and the German Greens were founded with an electoral agenda not very different from Daly’s ten proposals. He himself was published by the American Economic Association (a venue out of reach for ecological economists today), and even hired by the World Bank. How did the tide turn against



steady-state economics, and what are the political lessons for our generation of scholars and politically-minded people?

Third, those of us writing against growth are guilty of some inconsistency regarding whether we claim that growth is coming to an end on its own or whether we want to make it come to an end, as a response to its environmental and social impacts (e.g., climate change). This produces certain tensions. If the former is the case, then it is not clear why we should intervene to limit growth. There is a tension also insofar as we lament the exhaustion of resources like oil, where it is precisely their exhaustion that is necessary for ending growth and the associated with it environmental destruction. I notice this also in Daly's essay, where it is not clear to me whether he is arguing that:

1. GDP growth is coming to an end (if so, then why and where is the evidence for it),
2. That genuinely economic growth has come to an end, but nominal GDP may keep increasing (then the question becomes who has a benefit to keep uneconomic growth going), or
3. That growth continues, and we should therefore cap it, before it destroys the planet.

Personally, the argument that growth is coming to an end naturally, as a result of its ecological limits, does not convince me, although I have often made it, trained as an ecological economist as I am. Capitalism has surprised us with its creativity repeatedly in the past, and it might do once again. Daly's "fish example" suggests that growth in fisheries naturally ends when the fishing stock is exhausted. Yes, but then comes aquaculture with genetically modified fish. Growth in fish sales is sustained, though the ecosystem, our food chains and our bodies are irreversibly changed to something new. Isn't such creative destruction the history of growth and capitalism? Whether climate change is the ultimate limit upon which growth will stumble is an open question, but I wouldn't rush to put my bets on it.



This is also why I personally prefer Richard Norgaard's coevolutionary framework—whereby society and ecosystems coevolve, one constantly transforming the other, society adapting, for better or for worse, to its transformations—to the one offered by Daly whereby society is externally limited by a natural ecosystem. We have constantly transformed nature, and we will continue doing so. The problem is not that we are going to run out of oil, or that a climate catastrophe will bring growth, or much less life, to an end. Growth might well bounce back after a climatic disaster as it did after the catastrophe of the Second World War and the devaluation that it brought. And human life will continue no matter what happens to the climate, social organization taking new shapes and forms. The problem from my perspective is not that things will somehow end after crossing a limit, but that the socio-natural coevolution that will take place and the “socio-natures” produced after our transformations, and after the crossing of thresholds and boundaries, will be ones that are fundamentally undesirable and unequal. This won't be a planet worth living in for the majority of its inhabitants (though not necessarily for all)—and therefore one that we should avoid.

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### About the Author



Giorgos Kallis is an ecological economist, political ecologist, and Catalan Institution for Research and Advanced Studies (ICREA) Professor at the Institute of Environmental Science and Technology, Barcelona. He is the coordinator of the European Network of Political Ecology, the editor of *Degrowth: A Vocabulary for a New Era*, and the author of *Limits* and *The Case for Degrowth*. His research is motivated by a quest to cross conceptual divides between the social and the natural domains, with particular focus on the political-economic roots of environmental degradation and its uneven distribution along lines of power, income, and class. His current work explores the hypothesis of sustainable degrowth as a solution to the dual economic and ecological crisis. He was previously a Marie Curie Fellow at the Energy and Resources group at UC Berkeley, and he holds a PhD in Environmental Policy from the University of the Aegean, an MSc in Economics from Universitat Pompeu Fabra, and an MSc in Environmental Engineering and a Bachelors in Chemistry from Imperial College, London.



## Robert Paehlke

I enjoyed this article and agree with much of it, especially the need for the array of policies to slow societal metabolism. I also agree that wealthy societies less obsessed by growth are likely healthier and that GNP growth as a focus of economics as a discipline is excessive. I especially agree that restraining energy and material throughputs is crucial to the human and ecological future.

I am less sure, however, that reversing the rate of materials and energy extraction necessarily excludes economic growth. Most economic activity generates throughputs, but some activities are far lighter than others, more “angelic,” to use Daly’s delightful term. Some activities can result in throughput reductions. A group of friends can walk to a neighborhood restaurant and socialize dining on local organic food and beverages. Alternatively, the same amount of money might have been spent on air travel or the acquisition of heavy, not very durable goods manufactured on the other side of the planet.

While even university tuition or the production of solar panels generates environmental impacts, of course, are we certain that we cannot decouple economic growth and throughput growth? I agree that we have not succeeded in the past, but no society has ever actually tried. No one has, for example, implemented the full policy array that Daly proposes. Indeed, most do the exact opposite. They subsidize the extraction of materials and energy disproportionately. We could also go further than Daly suggests by supporting (yes, subsidizing) renewable energy, energy efficiency, and organic, local agriculture, for example.

I cannot prove that economies will continue to grow in the face of declining throughputs, but the contrary assertion is not certain either. Quickly slowing throughputs is key. It is no formula for



rapid growth, but we do not know with certainty whether growth is excluded by achieving this aim.

Why is this important? This, for me, is a matter of what Thoreau, in “Walking”, called “thoroughly conscious ignorance” (the wisdom of accepting what it is we cannot be entirely sure about).

Crucially, it is also politically important. Let me explain.

I do not think there is a democratic politics that could intentionally halt economic growth in poor countries. Thus a global steady state would require negative growth in wealthy nations. Many of us here, of course, could (and should) make do with less—less travel, less stuff, and less military spending in our names.

Nonetheless, I am pretty sure that politics in the face of rapid or continuous degrowth would get ugly. In the face of 1970s stagflation, under Reagan, deliberate redistribution upwards took hold politically in the United States. Aside from a very brief pause in the low unemployment 1990s, this pattern has remained entrenched almost everywhere ever since. Political life could well get uglier than that.

My hope, and it is just a hope, is that the political power to enact some approximation of Daly’s policies can be mustered. In the process it will be claimed, by those whom such a change threatens, that these policies will “collapse the economy.” I think that such assertions can be proven wrong by wise policy design and skillful entrepreneurship.

In addition to public and private innovation, we also desperately need economic redistribution. Daly knows this, of course, but my fear is that especially the latter would prove all but politically impossible without at least modest economic growth. Those with wealth and power will not accept diminished comfort quietly, and the opportunities for them to turn majorities against the protection of nature are considerably greater in times of economic contraction.



I accept that economic growth cannot continue forever, but is the forever point necessarily imminent? Politically, I am convinced, the best hope of creating a fairer world is prior to the realities of a steady state taking hold. Human well-being may well depend not just on ultimately learning to live without economic growth, but on doing so very gradually.

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### About the Author



Robert Paehlke, a political scientist, is Professor Emeritus of Environmental and Resource Studies at Trent University in Peterborough, Ontario, Canada. He was editor of the environmental journal/magazine *Alternatives* from its founding in 1971 until 1982 and continues to serve on its editorial board and blogs on the politics of the environment. He is author or editor of seven books, including *Hegemony and Global Citizenship: Transitional Governance for the 21st Century* (2014); *Some Like It Cold: the Politics of Climate Change in Canada* (2008); *Democracy's Dilemma: Environment, Social Equity and the Global Economy* (MIT Press, 2004) and *Environmentalism and the Future Of Progressive Politics* (Yale UP, 1991). In 1995 he edited *Conservation and Environmentalism: An Encyclopedia*.

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## Stephen Purdey

Herman Daly's summary of the principles and policies of ecological economics is clear and welcome, but, as he says, "it is something else entirely to say how we will secure the will, strength, and clarity of purpose to carry out these policies....Such will requires a major change in philosophical vision and ethical practice."

Instead of trying to transition to a steady-state economy, government leaders worldwide are still fixated on the pursuit of economic growth as a top policy priority. If a "major change in philosophical vision and ethical practice" is required to defeat this fixation, then we will first need a good understanding of its power to persuade. Here are two examples—one political and one ethical—of this power.

First, economic growth is politically expedient. Growth, as John Kenneth Galbraith once called it, is the ultimate social lubricant. It draws support and approbation from all sectors of society—rich and poor, employers and employees, public and private sectors alike, because they all stand to gain. The "rising tide lifts all boats" mantra is universally appealing and therefore politically compelling. It is also, of course, a utopian economic model which hints at an abrogation of governmental responsibility, even as it helps us understand the lure of growth.

Second, and more to the point in this conversation, the growth paradigm is morally convenient. It serves as a surrogate for distributive justice, as an easy way to sidestep the difficult ethical choices which governments would otherwise have to make in an economic context circumscribed by physical limits.

The growth paradigm serves up an irresistible image of the future that is cornucopian, equitable, and ecologically benign. It tells us that North-South issues will be resolved by integrating



developing and transitional economies into the free global market. It tells us that future generations will benefit from constructed capital goods which replace any resources depleted in the present, and that non-human species and their habitat will be protected by the beneficence engendered by prosperity. In short, under the dominion of the growth paradigm, the need to share—with the poor, with future generations, or with other species—is displaced by an economic surrogate spawned by the false belief that betterment follows necessarily from the unrestricted freedom to grow.

In fact, economic activity is essentially amoral; it is the sum total of mechanical transactions between consenting partners. Consistently moral outcomes—especially regarding vast and complex issues such as North-South poverty alleviation, multi-generational sustainable development, and the preservation of biodiversity—cannot be generated by amoral economic processes. Absent ethically robust socio-political oversight, ecological degradation and other pathologies will continue on a planetary scale.

The foregoing does not answer the pivotal question of how exactly the transition to a steady-state global economy might occur, but Daly has sent the clear message that philosophy, ethics, and perhaps religion too must be key ingredients in the process. I agree, adding that the growth paradigm is most vulnerable, and therefore most susceptible to change, along its moral dimension.



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### About the Author



Stephen Purdey is an international relations specialist whose work focuses on the evolution of new forms of global governance to meet current social-ecological challenges. He is the author of such books as *Economic Growth, the Environment and International Relations: The Growth Paradigm*; *The Normative Root of the Climate Change Problem*; and *The Environmental Crisis: Metanarrative and the Moral Evolution of Modern Human Society* (forthcoming). Prior to his academic career, he worked for in the private sector, in Canadian federal politics, and with NGOs such as the United Nations Association, the World Federalists, and the Earth Council. He holds a PhD from the University of Toronto.

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## Alan Willis

This profound essay by Herman Daly, plus the illuminating and appropriately challenging response from [Bill Rees](#), should be required reading in all business schools as well as economics and accounting curricula. A condensed “executive version” should also be published in all widely read leading business, accounting, economics, and public policy journals—not just in academia. Conversations and initiatives about sustainable capital markets and focusing capital on the long term, such as we are now seeing, can be enriched and encouraged by such thinking, which calls in effect for consideration of new paradigms about wealth and prosperity and whether the achievement of long-term societal well-being can be uncoupled from incessant growth measured solely in GDP terms.

As a professional accountant, I must confess it was not until rather late in my career that I realized that financial accounting as I had learned and practiced it evolved to what it is today (providing sadly incomplete information for twenty-first century decision-making) under the influence of and unthinkingly incorporating the flawed assumptions of the paradigm of mainstream economics.

Physics has moved on in the last hundred years or so, and, thanks to Einstein and others since, has evolved beyond the confines of Newton’s Laws (which long sufficed for understanding phenomena at a certain scale of known reality). Correspondingly, accounting that was devised for tracking the commercial transactions of Venetian merchants five centuries ago was useful in its day, and its double-entry model even sufficed into the Industrial Age. Now—and urgently—accounting needs to be reinvented and made fit-for-purpose in decision-making on the planet of the twenty-first century as we now understand it and use it, facing the enormous future pressures of foreseeable population growth, urbanization, and so on.



The accounting profession is now becoming engaged in innovative initiatives such as Natural Capital Accounting and Integrated Reporting, which aim for a more holistic and realistic way of portraying the true nature of the ecological resources and systems that organizations (business and other) depend on and impact in their activities to create value for society—in whatever ways we define that value. But just as the challenges facing the planet and its people cannot be left for action by future generations, accountants must act now if natural as well as financial capital-related resource allocation and management decisions are to be based on a more relevant, complete, and dependable information set than last year's financial statements.

It's been said that "accountants would save the world," but I would have to add that they won't be able to do it alone. I'm glad to report that an increasing number of accountants and accounting bodies now recognize this need for action and are committing themselves to work (with other stakeholders and disciplines as necessary) on transforming or reinventing accounting—maybe not saving the world with a screen of new charts and numbers or a novel sustainability app, but certainly essential for those whose decisions aim to save the world.

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### About the Author



Alan Willis is an independent researcher, writer, and advisor on the implications of sustainability for corporate performance measurement, accounting, reporting and assurance. Prior to 1991, he was a partner with Deloitte. He represented the Canadian Institute of Chartered Accountants on the founding Steering Committee of the Global Reporting Initiative and was a member of the Working Group of the International Integrated Reporting Council, the Steering Committee of the Global Initiative for Sustainability Ratings, the Advisory Council of the Sustainability Accounting Standards Board, and the Integrated Business Reporting Committee of the International Corporate Governance Network. He has authored or co-authored numerous CPA Canada research and publications about corporate business reporting and accounting for and reporting on sustainable development.

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## Eric Zencey

Herman Daly's essay makes clear that ecological economics and its corollary, steady-state economic thinking, represent a return to economics as it was practiced in the nineteenth century—when it was known as political economy, the integrated treatment of morals and economics, ultimate ends and efficient means. Late in that century, economics calved off from political economy, leaving behind political science and political philosophy as the residuum. It did this in service to the ideal of becoming rigorously scientific.

It is odd, then, that alone among disciplines with any pretense to analytic rigor, economics has steadfastly resisted the thermodynamic revolution that swept physical and life sciences in the nineteenth and early twentieth centuries. Physics, biology, chemistry, geology, even the study of history were transformed, but not economics.

I think we can blame this on bad timing, willful ignorance, and oil.

### **Bad Timing**

In the late nineteenth century, the archetypal science was physics, and physics was Newtonian mechanism. Ignorant of what a young thermodynamic theorist named Albert Einstein would soon do to the Newtonian paradigm they emulated, economic “scientists” set about mathematically modeling the economy as sets and subsets of self-contained, equal-and-opposite actions and reactions, happily (and explicitly) assuming that all economic activity consists of ahistorical, which is to say completely reversible, processes. No one with a nodding acquaintance with the law of entropy could have countenanced this. Entropy is time's arrow, the law of irreversibility; it describes the one-way flow of energy use. A purely mechanical process can be run forward or backwards, but we will never invent a machine that can suck in exhaust



gases, heat, and motion and transform them into gasoline. The entropy law can tell you why. Newton couldn't.

Just as a consumer is loath to trade in a new appliance when an even newer one comes on the market, neoclassical economists weren't about to retool their brand new thinking to reflect changes in the underlying metaphysics they had been so keen to adopt.

Because the entropy process is time's arrow, and because Daly's work is aimed at fostering the long-delayed thermodynamic revolution in economics, it is entirely appropriate that his essay touches at several key points on the necessity for political economy to understand its subject matter historically. As with many paradigm-defining truths, once the idea has been stated, it seems obvious: elements of the neoclassical model that could pass for true on a large and forgiving planet a hundred years ago are obviously not true today, when the planet's source-and-sink services are severely taxed, when natural capital is the limiting factor in production, when there are seven billion of us and our economic wants, capacities, and expectations have been amplified by our access to the ancient sunshine of fossil fuels.

### **Willful Ignorance**

By modeling the economy as a closed and circular system, neoclassical economists have encouraged themselves to operate in a remarkable state of denial about the physical roots and ecological consequences of our wealth-creating activities. And yet economics has experienced no paradigm-shaking crisis as a result. Neither climate change nor any of the other source-and-sink catastrophes facing civilization have been laid at the feet of bad economic theory. One reason for this is that neoclassical economists succeed in treating environmental costs as "externalities." How could environmental degradation be the result of economic activity if it is external to the economy?



In its self-confirming isolation of the economy from nature and theory from reality, neoclassical economics amounts to a highly principled practice of solipsism. When this pathology is manifest in an individual, it produces unpleasant consequences that might eventually prompt some reflection and personal growth. Not so with the collective delusion of mainstream economists. Evidence of our ongoing ecological catastrophe falls far from their purview—not just disciplinarily but geographically, as the wealthier nations (wherein the vast majority of economists reside) export their ecological footprint to the impoverished nations of the world. And for several generations (at least since Reagan defeated Carter, removed Carter’s solar panels from the White House, and ushered in an era of GDP growth through de-regulation of the social and ecological damage done by economic growth), there has been a strong self-selection among students of economics. Undergraduates with any kind of deep personal connection to natural systems tend to find the study of standard economics unattractive, displeasing, even soul-deadening. This leaves the field to those most willing to bracket off as irrelevant to their professional purpose any question about the moral and ethical consequences of economic activity, any question about the health and maintenance of nature, any question about the economy’s relation to the larger social and natural systems within which it operates.

### **Oil**

Even so, you might expect that a discipline with such a demonstrably deficient view of its subject matter would fail of its object—would fail to offer wise counsel about the collective project of augmenting the stock of wealth that humans can enjoy. But economics has had much apparent success. Despite regular downturns and financial crises, the wealth produced by our economies has grown and grown and grown. I think there is a ready explanation that becomes visible through the conceptual lens of ecological economics. Energy is one of three elemental factors of production (along with matter and human design intelligence), and when your economy operates on an energy source that cranks out wealth-making value in a ratio of 100 to 1—the estimated energy return on energy invested (EROI) that petroleum offered us in the early



twentieth century—you can believe anything you want about how economies operate and your economy will still generate a great deal of wealth.

In other words, oil granted the new science of economics immunity from being proven false by events. Ironically enough, falsifiability of principles and propositions is one solid measure of a science. (Non-falsifiable beliefs are called faiths.)

In effect, the discipline of economics has a free rider problem—it has been given a free pass by the enormous power of oil to misunderstand itself and its subject matter. You could also recognize it as having a Midas problem. Like the power granted to that legendary king, the power of wealth generation that oil granted to our economy made it impossible for the discipline of economics to connect in any fundamental way with otherness, including the otherness of the planet and its role in the very processes that economics presumes to model. Midas rued his gift when he touched his daughter and transformed her into extension of his self, his will, his wealth-creating power. Urban planners and neighborhood organizers regret what wealth-creating oil, in the form of the personal automobile, has done to our cities, just as environmental activists and systems ecologists are sorrowed by what diesel engines and our oil-fed population explosion have done to the planet. Like Midas, neoclassical economists may yet learn to rue what our wealth-generating gift has done to them and their discipline.

### **Revolutionary Portent, Future History**

Long delayed, the thermodynamic revolution in economics cannot be permanently forestalled. For one thing, it is getting harder and harder for the neoclassical model to maintain the pretense that economic activity takes place in abstracto—on the clean blank sheets of paper on which they write their formulae, with no roots in or consequences for anything outside of itself.

Economic truths derived on the model of Newtonian mechanism are supposedly abstract and



ahistorical, but our planet and our economy are most assuredly evolving concretely and over time.

The driving dynamic of this economic and planetary change has been human use of high-EROI fossil fuel. The driving dynamic of the history yet to come is the declining EROI of our civilization's energy sources. You can see some of the consequences already:

- Despite a rising real per capita GDP, for a significant percentage of workers in OECD, nations personal income has flatlined or is declining.
- As more and more economic effort goes into the overhead of providing energy to the economy, there is less left for other sectors. "Austerity" becomes the watchword for governmental budgets, even in the wealthiest nations in the world.
- Developed countries find it increasingly difficult, if not impossible, to pay maintenance and upgrade costs on infrastructure investments made in the heyday of 100-to-1 oil.
- Governments are reducing their scope and energy at the exact moment that sustainability would have them take strong action to rein in the corporate tendency to maximize profits by degrading the commons and externalizing other costs.
- Pension-fund wipeouts are becoming common as one way to fulfill the economy's structural need for debt repudiation—a need that lies in our system's willingness to let debt grow faster than an increasingly deregulated but declining EROI economy can pay back.
- The planetary carbon sink is full, producing climatic effects that even an abstraction-inhabiting, arithmo-morphizing economist has to acknowledge as a troubling reality.



Centuries from now, economic historians are likely to understand the relationship between EROI and wealth creation much better than does the average economist of today. I think it likely that future political economists will express wonder not at the twentieth century's enormous economic success, but at how little we actually added to our stock of wealth for all the high-EROI coal and oil it was our pleasure to burn. They are almost certain to shake their heads in wonder that we, enjoying an energy supply and an EROI never seen on the planet before or since, could ever have experienced an economic downturn, could ever have let a human starve from want, could ever have been so programmatically blind to the physical origins of our fortunes.

### **Democracy's Lost Habitat**

I am afraid that those economic historians will also bemoan the fact that we alive today did not fully appreciate another truth: on a fully developed planet, economic growth is no longer the friend of democracy, but its enemy. A new, thermodynamically enlightened political economy needs to notice this: We run our planet like a badly managed factory, with a cost-be-damned focus on maximizing the output that we humans (supposedly) desire. Unfortunately, it does not make much sense to talk about individual liberty and democratic freedom in a factory. (Engels himself said that an appropriate motto for the gates of every factory was "Abandon all autonomy ye who enter here.") As trade agreements like NAFTA and the TPP make all too clear, a planetary economy run like a factory has no room for the inefficiencies of democracy or local control. Nor can a maximum-throughput society, budgeted right up to the edge of what the planet can sustainably offer to us in the form of resources and sustainably absorb from us in the form of waste, tolerate the possibility that democratic decision-making might misjudge a relevant limit and crash the system. Daly's full planet—what I have elsewhere called Factory Planet—is a planet that must be run by technocrats if it is to have any chance of supporting human civilization sustainably.



### The Ultimate End

And this leads to a friendly amendment I offer to Daly's statement of the ultimate economic policy goal. I think it needs to be tweaked to reflect the reality that the good life has elements that reach far beyond material well-being, and that these non-wealth elements are nevertheless affected by economic policy. Political philosophy has long posited that, politically, the good life consists of the enjoyment of individual liberties, political rights, and the appropriate exercise of political agency—the ability to participate in the decisions that affect one and one's community. The good life also requires that we be capable of encountering nature as other, as an occasion for experiences that lift us out of ourselves and out of a world consisting solely of human acts and works. This is one strong theme in John Stuart Mill's chapter "On the Stationary State" that Daly mentions. The author of *On Liberty* saw a direct connection between his defense of the individual's right to develop his or her excellences in society and his call for recognizing that at some point the ecological footprint of the economy must cease to grow. After the thermodynamic revolution in economics, when the discipline is restored to its proper wholeness as political economy, it may no longer be unthinkable to open an economics textbook and find a sentence like this one, taken from that chapter in Mill's [Principles of Political Economy](#):

Solitude, in the sense of being often alone, is essential to any depth of meditation or of character; and solitude in the presence of natural beauty and grandeur, is the cradle of thoughts and aspirations which are not only good for the individual, but which society could ill do without.

I think economic policy needs to honor Mill's idea that individual encounter with nature's sheer otherness is in some significant measure a civic necessity and a political value, even as that otherness is sorely taxed by climate change and the relentless ubiquity of the human presence.



In sum, I suggest the following as the appropriate goal of a post-Newtonian political economy: maximizing the cumulative number of human lives ever to be lived over time at a level of per capita wealth, a level of individual political liberty, and with a degree of access to untrammelled natural systems sufficient for the good life. Without the additional specifications covering liberty and nature, we risk providing a strictly material version of the good life on a Factory Planet run by technocrats, with no democracy and no wilderness in sight.

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### About the Author



Eric Zencey is an Adjunct Professor at the University of Vermont and a Fellow at the Gund Institute for Ecological Economics. His work is located at the intersection of ecology, history, economics, social theory, political science, and political theory. At the Gund Institute, he is the Coordinator of the Vermont GPI Project, which is compiling an updated Genuine Progress Indicator for Vermont for implementation as an alternative policy and budgeting instrument in the state. Eric is also a visiting lecturer in the Architecture and Urban Planning program at Washington University in St. Louis. His essays have appeared in *Orion*, *The North American Review*, *Adbusters*, and *The Chronicle of Higher Education*, and on the op-ed pages of *New York Times* and the *International Herald Tribune*.

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## Author's Response



## Author's Response

I would like to begin by noting that, despite our differences, there was a significant foundation of agreement. Consider, for instance, the following seven specific criticisms of growthism that we all appear to share:

- (1) that throughput growth (and even GDP growth) can be uneconomic in theory, and in some countries has become uneconomic in practice;
- (2) that the limiting factor has changed from manmade capital to natural capital;
- (3) that the metabolic resource throughput of the economy is entropic and necessarily entails costs of depletion, pollution, and ecosystem disruption;
- (4) that commonly used multiplicative production functions are analytical misrepresentations of the process of production, enshrining factor substitutability while ruling out complementarity and therefore the possibility of a limiting factor;
- (5) that right prices, while important for efficient allocation, do not solve the problem of optimal scale of the economy;
- (6) that pursuit of growth has functioned both as a stimulus to increasing inequality, as well as an excuse for ignoring it (until such time as growth has presumably made everyone rich); and
- (7) that capital immobility between nations is a logical premise of the Ricardian comparative advantage argument for free trade—i.e., free capital mobility is incompatible with the theory of comparative advantage traditionally used to defend free trade, including recently the TPP.



Now, let me move on to some specific replies.

Thanks to Stephen Purdey for his cogent remarks. I certainly agree that “the growth paradigm is most vulnerable, and therefore most susceptible to change, along its moral dimension.” I would only add the thought that growthism is by no means as safe along the economic dimension as it usually appears. Arguments for growth presuppose that it is making us collectively richer, when that is increasingly false. Every day, it becomes clearer that growth is increasing costs faster than benefits, and by any reasonable accounting of the negative value of illth (jointly produced with wealth), growth in throughput is making us poorer, at the margin in already wealthy countries. Recognition of this is obscured by the fact that though we are collectively made poorer by growth, the elite still gets richer thanks to increasing inequality. Perhaps the elite could be made to feel the uneconomic nature of growth, either by their own moral and intellectual conversion or by rebellion of the majority that comes to realize that they are getting most of the illth and little of the wealth. Growthism will be a hard sell if we ever realize that, collectively, growth has become uneconomic in the basic sense of costing us more than it is worth and therefore making us poorer. This realization would be hastened by a more inclusive understanding of “us.” The biggest obstacle to this hope, in my opinion, is the regression of economics from its origin in moral philosophy to its present “value-free” pandering for growthism, as discussed in Eric Zencey’s comment, and the acceleration of this retrogression since the 1970s noted by Giorgos Kallis.

Robert Paehlke sensibly asks, “Are we certain that we cannot decouple economic growth and throughput growth?” He is more optimistic about decoupling than I am, although of course there is uncertainty. But from a policy perspective, it does not matter. This is because we agree that throughput must be limited. If we keep throughput limited, we can gladly encourage value and welfare to grow. If technological optimists really think we can increase resource productivity without limit, then they should not object to limiting resource throughput. Technology can still



work its miracles on a constant resource throughput. Indeed, it will have a stronger incentive to do so in the face of more expensive resources.

I think legitimate confusion arises from the fact that we have no good measure of aggregate resource throughput. We therefore often resort to the proxy of real GDP—a price-weighted index of final production, and therefore indirectly of physical throughput. Paradoxically, GDP is more tightly correlated with throughput (cost) than with either measured welfare or self-evaluated happiness (benefit). We could use energy content or mass as direct physical measures, and that has been done.<sup>1</sup> Once again, the important thing is to limit resource throughput and consequent environmental cost. I am all in favor of doing more with less, and it does not matter if I underestimate technological optimists' ability to do so—I am eager to be wrong on this question, and applaud technology when it gives us more welfare without more throughput. But nuclear power, fracking, big dams, industrial agriculture, mountain top removal, deep sea drilling, etc., are technologies designed to increase throughput, and they are inefficient by any inclusive counting of costs and benefits. I hope the soft path technical efficiency optimists, like Amory Lovins, are right. Let's give them some help by making the alternative brute technologies more expensive!

Alan Willis's comments from an accountant's perspective are very welcome. Indeed, the whole problem of unsustainability might be viewed as a national accounting error—counting capital consumption as if it were income. Income is the maximum that a community can consume in a time period without reducing its capacity to produce and consume the same amount in the next period—that is, without reducing future capacity to produce, or “capital” in the broad sense. This definition comes from standard economics (Sir John Hicks, Nobel Laureate). Historically, the whole reason for income accounting was to avoid impoverishment by inadvertently consuming our capital. Although we mainly neglect natural capital consumption, we also consume manmade capital beyond realistic depreciation set-asides. Another accounting error is to count defensive expenditures (e.g., pollution clean-up) as income, with no corresponding deduction for



the cost of the pollution that made the clean-up necessary—"asymmetric accounting," as Dutch economist Roefie Hueting called it.

I am especially grateful for Giorgos Kallis's comments which are both supportive and challenging. I would like to offer a few words on each challenging comment.

Regarding terminology ("growth" versus "development" versus "flourishing"), the dictionary recognizes the qualitative dimension of "development" that I want to distinguish from quantitative "growth," as well as noting the overlap in common usage. So I think my distinction is good English, even if many people loosely use development synonymously with growth. I was interested to learn that Greek uses the same word for both. But the important distinction is "quantitative increase" versus "qualitative improvement," and I believe that is a distinction recognized in all languages, even if not in single words. Perhaps "better, not bigger" captures the distinction in fewer words. I have no objection to "flourishing" instead of "developing," but doubt that the World Bank would change its name to "the International Bank for Reconstruction and Flourishing." They would think it too "flowery." And even if they did change, they would soon be using flourishing to mean growth, just as they already redefined "sustainable development" to mean growth. Now they speak of "sustainable growth" without embarrassment. Historically, one is stuck with confused language.

Kallis asserts that the political path to a steady-state economy appears unlikely. I would agree, and I addressed this point in the last section on the Ultimate End. I know I gave no real answer, but I think that searching for a secular, value-neutral, political answer outside the context of philosophical and religious renewal will be fruitless. I know that in academia such appeals to higher things are considered unscientific and therefore "cheating." So be it—it still may be necessary (even if it remains unlikely) given the backward movement since the 1970s for which Kallis seeks an explanation.



Kallis also points out a tension among three limits-to growth-positions:

- (1) GDP growth is coming to an end (if so, then why and where is the evidence for it).
- (2) Genuinely economic growth has come to an end, but nominal GDP may keep increasing (then the question becomes who has a benefit to keep uneconomic growth going).
- (3) Growth continues, and we should therefore cap it, before it destroys the planet.

My position is closest to number 2, that genuinely economic growth has come to an end (at least in the US), but GDP keeps on increasing. But then Kallis reasonably asks, who benefits from keeping uneconomic growth going? I am afraid that is the top 1% , who have almost exclusively benefitted from growth in the past few decades in the US. How have they done that? By massively externalizing real costs of production to the public, the future, and other species; by keeping wages down through automation, off-shoring, deregulated trade, and cheap-labor immigration policies; by financial fraud, quantitative easing resulting in zero interest rates for savers and big borrowers, with usurious rates for credit card debt; and by government subsidies and tax loopholes favoring the rich. And all of these measures have been supported in the name of growth and trickle-down economics. Even the Left has bought into the “bigger-pie theory” as the best hope for the working class, and is confused by growthism.

Richard Norgaard’s coevolutionary framework (“whereby society and ecosystems coevolve, one constantly transforming the other, society adapting, for better or for worse, to its transformations”), to which Kallis refers, seems to me completely consistent with steady-state economics. Evolution and coevolution are the way the natural world works, and the economy, as a subsystem, must coevolve as the world evolves. But our old coevolutionary strategy of growth into an empty world has become maladaptive in the full world that continues to evolve, but not to grow. A steady-state economy looks like a more promising coevolutionary strategy.



Nancy Folbre invites us to “[c]onsider the potential to completely destroy our ecosystem [even in the empty world] with nuclear war or genetic engineering gone awry.” Yes, the world does not have to be full before bad things can happen, and that is worth remembering. In Figure 3, the catastrophe limit could occur anywhere along the horizontal axis. Also thanks for noting my cost advantage of taking up less space than a million neoclassical economists. However, that reminds me of once riding in a tiny elevator with two rather small Japanese economists. I was taking up over half the space. One Japanese colleague drily said to the other, “Professor Daly big resource waste.”

Tim Jackson has been busy reforming economics rather than trashing it, and I wholeheartedly agree with that approach, as do many other ecological economists. I confess to getting impatient with some economists and their either obtuse or cynical defense of growthism.

Jackson raised three challenging and important points.

First, *Politicians are right to seek some form of convincing that a steady-state economy or a degrowth economy will not lead to collapse.* Yes indeed, soft landing strategies, safety nets, and an equitable sharing of burdens need more attention. Of course, politicians should not be allowed to pretend that growth is not the fastest road to collapse.

Second, *ease up on labor productivity, in addition to advocating more leisure.* Some services cannot be mechanized without qualitative degradation, but there is a tendency to do so anyway because of competition from sectors with increasing productivity will raise wages in those sectors and drain labor from the service sector. The service sector adapts to fewer workers by striving to increase labor productivity in services, which is perverse in the arts and personal services. Limiting resource throughput will reduce labor productivity in physical goods and put less competitive pressure on labor productivity in services. And there are many other reasons to reduce resource throughput. This is a connection I have not thought of before.



Third, *the days of insisting on the predominance of a single numerical indicator should be definitively over*. I take the point, and yet I made a stab at offering a better single numerical indicator. The technical language of “maximizing cumulative number of lives ever to be lived over time, subject to the constraint of a per capita wealth sufficient for a good life” is admittedly a too-exacting analytical statement of John Ruskin’s dialectical dictum that “there is no wealth but life.” It also probably gives too much weight to the uncertain future. Even so, I think it improves upon the current logically and ecologically impossible triple maximization of “ever more things, for ever more people, forever.” Admittedly, that is a low bar from which to measure improvement in our approximation of the Ultimate End. I continue to think of the Ultimate End as necessarily singular, in the sense of the Aristotelian-Thomist “summum bonum,” with intermediate ends as plural, to be ranked with reference to the Ultimate End. I expect plural views on the nature of the singular Ultimate End will give rise to plural penultimate operational ethical rules. The default penultimate rule of “ever more things, for ever more people, forever” is the very definition of growthism, and it urgently needs to be replaced by something better, even if only by a less bad single numerical indicator.

As for Eric Zencey’s lucid historical analysis, I think it is right on target. Bad timing, willful ignorance, and the oil bonanza explain a lot about how we arrived where we are. His comment is a valuable essay on its own.

Thanks to John Barry for his thoughtful clarifications and extensions on a number of points. I will quote only one: “...undifferentiated economic growth as a permanent feature of the economy is an ideology which serves elite interests in both disciplining populations and especially in removing the issue of socio-economic redistribution and inequality from the political agenda.”



### Endnotes

1. Christina Layke, et al., *Weight of Nations: Material Outflows from Industrial Economies* (Washington, DC: World Resources Institute, 2000); Marina Fischer-Kowalski, Mark Swilling, et al., *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth* (Geneva: United Nations Environment Programme, 2011).